

PATENT

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5 **Applicant:** Alpern, et al. **Confirmation No.:** 7766

Application No: 09/881,501 **Group Art Unit:** 2161

Filed: 6/14/01 **Examiner:** E.P. Leroux

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Title: *Redirection of misses in queryable caches*

15 Commissioner for Patents
 Alexandria, VA 22313-1450

Reply Brief under 37 CFR 41.41

Demonstration that Bogantz does not anticipate Appellants' claims

20 Examiner rejects Appellants' independent claims 5 and 15 under 35 U.S.C. 102 as
 anticipated by U.S. patent 6,243,715, Bogantz, *Replicated database synchronization
 method whereby primary database is selected, queries to secondary databases are
 referred to primary database, primary database is updated, then secondary databases
 are updated*, issued June 5, 2001 (hereinafter "Bogantz"). That Bogantz does not
25 disclose what Appellants are claiming is immediately apparent from the first sentence
 of Bogantz's *Abstract*, which reads as follows:

A database system comprises a plurality of replicated databases ...

The preambles of Appellants' independent claims 5 and 15, by contrast, read as
follows:

30 **5.** A method employed in a *distributed database system* that includes a
 plurality of *database systems* for responding to a request received in a
 particular database system of the plurality

15. Apparatus that redirects at least a part of a request received in a
35 *particular database system* belonging to a *distributed database system*
 to *another database system in the distributed database system*
 (emphasis added)

The differences indicated by the language of Bogantz's *Abstract* and the language of
40 Appellants' claims are further apparent from an examination of the figures of the
 application and the patent. Bogantz' FIGs. 1 and 2 show what one would expect from
 the *Abstract*: as set forth beginning at the bottom of col. 5 in Bogantz, FIG. 2 shows

a database system 100 according to the present invention ... The database system 100 comprises a plurality of replicated databases 101-103, a database provisioning system 104 and a database querying system 106.

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What makes the replicated databases 101-103 into a *database system* is database querying system 106, which is described as follows at col. 6, lines 30-33:

The database querying system 106 is configured to retrieve specific records from the databases 101-103 as requested by one of a number of database users 108 accessing the database system 100.

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As those skilled in the relevant arts will immediately understand, database querying system 106 is an example of what is termed in Appellants' Specification a "query engine". See page 13, lines 26-27. Indeed, Appellants' Specification states at that point,

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Continuing in more detail with database system 203, like all database systems, database system 203 includes a query engine 205 and a database 220.

A *database system* is thus defined in Appellants' Specification in exactly the same way as it is in Bogantz: a database system is a system that has a query engine and a database.

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An embodiment of the *distributed database system* of Appellants' claims is shown in FIG. 2 and discussed beginning at page 12, line 10. The section title for the discussion is *Modifying a distributed database system with a materialized view site so that the materialized view site can function as a queryable cache: FIG. 2*. The figure is described at page 12, lines 15-20 as follows:

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FIG. 2 shows how a distributed database system with a materialized view site can be modified to make the materialized view site function as a queryable cache.

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Database system 201 in FIG. 2 includes a redirecting database system 203 which is a modified materialized view site and a redirection target database system 229 which is a master site for redirecting database system 203.

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FIG. 2 corresponds to the above description. Database system 201 is a distributed database system which includes "a redirecting DBS [database system] 203" and a "redirection target DBS 229; only the internal details of DBS 203 are shown; as

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would be expected from the foregoing definition of "database system", DBS 203 has a query engine 205 and a database 220. As a "database system", DBS 229 has the same components.

5 In the terminology used by both Bogantz and Appellants, Bogantz discloses a single database system, albeit one with a plurality of databases; it does not disclose Appellants' "distributed database system that includes a plurality of database systems"; the reference consequently cannot anticipate Appellants' independent claims 5 and 15.

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As one would expect, Appellants' claimed "distributed database system that includes a plurality of database systems" responds to a request for data differently from the way that Bogantz's "database system compris[ing] a plurality of replicated databases" responds to a request for data. That difference appears in the bodies of claims 5 and
15 15.

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The problem which Bogantz actually addresses is handling queries on records that are being updated. Bogantz' plurality of databases include multiple copies of records (col. 6, lines 3-5). When one copy of a record is being updated on one of the
20 databases, Bogantz redirects queries on that record to another copy on another of the databases. The redirection is described like this at col. 6, line 66-col. 7, line 10:

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25 The pointer field in each record is used to indicate that an update is in progress. A non-zero value in the pointer field indicates that an update of the record is in progress. The non-zero value actually corresponds to the index of the current selected database. Accordingly, if the pointer field of a record being queried has a non-zero value, the database will halt processing of the query and launch a request back to the querying system 106 to send the query to the selected database indicated by the pointer field. The pointer field therefore performs the dual function of indicating
30 that the record is being updated and identifying the database which is the selected database.

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Thus, what happens in Bogantz when a record in a database is being updated is that the record being updated has a pointer to another database that contains a copy of the
35 record that is not being updated. The queried database returns the pointer from the record and the querying system uses the pointer to query the other database. The

redirection is thus from the first database to the querying system to the second database.

In Appellants' distributed database system, when the database system that has received a request that needs to be executed in whole or in part in another database system of the distributed database system, the receiving database system redirects the request in whole or part *to the other database system*. This behavior of Appellants' "distributed database system" is clearly set forth in the bodies of claims 5 and 15:

determining whether the execution of the request is preferably
done at least in part in another database system of the plurality; and
if that is the case, redirecting that part of the execution to the other
database system. (claim 5)

a request analyzer in the particular database system that determines
that the request is preferably executed at least in part in the other
database system; and
a redirector in the particular database system that redirects
execution of at least the part of the request to the other database system.
(claim 15)

Because Bogantz discloses only a single database system, it cannot and does not disclose the claimed "redirecting that part of the execution to the other database system". Thus, Bogantz does not disclose what is set forth in the bodies of independent claims 5 and 15, and for that reason, too, Bogantz does not anticipate claims 5 and 15.

Claims 6 and 19 and 7 and 16 are not anticipated by Bogantz because they are dependent from claims that are not anticipated. Moreover, because Appellants' claims are directed to a "distributed database system that includes a plurality of database systems" rather than to Bogantz's "database system compris[ing] a plurality of replicated databases", Bogantz also cannot and does not disclose the further limitations of these claims. In the case of claims 6 and 19, the objects are "objects belonging to a plurality thereof in the distributed database system", not in databases in a single database system and what is determined is whether an object "is lacking in the particular database system", not in a database of a single database system.

In the case of claims 7 and 16, the database system receiving the request first puts the request in the form required to execute the request in that database system and then if the request has to be redirected, modifies the form so that it can be redirected to the other database system. In Bogantz, by contrast, the database querying system in
5 Bogantz's single database system first puts the request in a form such that it can be executed in a first database of the database system and then modifies it so that it can be executed in a second database of the database system.

With regard to claims 8 and 17 and 9 and 18, these claims are dependent from claims
10 7 and 16 which, as shown above, are not anticipated by Bogantz. The claims are rejected under 35 U.S.C. 103. The rejection depends of course on the rejections of claims 7 and 16 under 35 U.S.C. 102. Further, the cited location in the Taylor reference whose addition forms the basis of the rejection of claims 8 and 17 discloses only that SQL exists; it discloses nothing about the claimed cursor that includes the
15 SQL statement and is marked for redirection. Similarly, the cited location in the Souder reference whose addition forms the basis of the rejection of claims 9 and 18 discloses only that remote procedure calls exist; it discloses nothing about rewriting the call "in a form required for execution as a remote procedure call directed to the other database system", as required by the claims.

Detailed response to Examiner's Answer

The objection to the Specification

Examiner objects to the Specification because it contains an embedded hyperlink on page 4, line 30 which has not been disabled. Appellants respectfully point out that the
25 Specification was amended to disable the hyperlink in Appellants' amendment of May 30, 2006.

The rejections of the claims

See the foregoing *Demonstration that Bogantz does not anticipate Appellants' claims*.

The interpretation of the claim language "a distributed database system that includes a plurality of database systems"

Examiner states at page 8 of his *Reply* that Appellant makes no distinction between "a plurality of database systems" and "a distributed database system". The distinction is of course that the "plurality of database systems" in the "distributed database system" cooperate with each other. Indeed, claims 8 and 15 are specifically addressed to how the "plurality of database systems" in Appellants' "distributed database system" cooperate with each other to handle requests which cannot be completely dealt with in the distributed database system which receives the request.

Examiner further states that the portion of the Specification cited in the *Appeal Brief* does not provide antecedent basis for the claim term "distributed database system". He is correct, but the antecedent basis *is* provided in the immediate preceding paragraph, as shown in the discussion of FIG. 2 cited above:

FIG. 2 shows how a *distributed database system* with a materialized view site can be modified to make the materialized view site function as a queryable cache.

Database system 201 in FIG. 2 includes a redirecting database system 203 which is a modified materialized view site and a redirection target database system 229 which is a master site for redirecting database system 203. (Specification, page 12, lines 15-20, emphasis added)

The discussion of FIG. 2 also discloses how the database systems that make up the distributed database system cooperate to "respond to a request received in a particular database system".

Examiner's resort to dictionary definitions to interpret Appellants' claims

Because Appellants' Specification clearly sets forth that the "distributed database system" of the application includes "a plurality of database systems" and also clearly shows that the database systems of the plurality interact as described in claims 5 and 11, there is no need for Examiner to resort to dictionary definitions to interpret Appellants' claim language. It should be pointed out, however, that what the dictionary definitions define is a *distributed database*, not the "distributed database system" of Appellants' claims.

Examiner then uses the dictionary definitions of "distributed databases" to demonstrate that "the disclosure by Bogantz is consistent with the above definitions of

'a distributed database system". Examiner cites Bogantz, col. 5, line 65 through col. 6, line 40. The first two lines of the cited portion of Bogantz read as follows:

5 Referring now to FIG. 2, a database system 100 according to the present invention is illustrated. The database system 100 comprises a plurality of replicated databases 101-103, a database provisioning system 104 and a database querying system 106.

In the face of the foregoing clear language, Examiner summarizes Bogantz's disclosure as follows:

10 Bogantz in Figure 2 discloses a database system 200 which comprises *a plurality of database systems*, i.e. database 101, database 102, database 103. (*Answer*, page 11, bottom, emphasis added)

The summary ignores both the fact that the cited definitions are for *distributed*
 15 *databases*, not for "distributed database systems" and Bogantz's clear description of his system as a "database system compris[ing] a plurality of replicated databases". Because a definition of a "distributed database" is not a definition of a "distributed database system" and because Bogantz *by its own terms* discloses "a database system compris[ing] a plurality of replicated databases", not Appellants' claimed "distributed
 20 database system [including] a plurality of database systems" Bogantz cannot and does not anticipate Appellants' claims.

25 *Examiner's interpretation of "redirecting that part of the execution to the other database system"*

As pointed out in the Appeal Brief, this limitation of Appellants' claim 5 is supported at page 12, line 23 through page 13, line 14 of Appellants' Specification:

At the highest level, database system 201 operates as follows:

- 30 1. Database system 203 receives an SQL request 204;
2. Database system 203 attempts to execute the SQL request; as part of executing the SQL request, database system 203 parses the request. As part of parsing the request, database system 203 determines whether the request can be executed in database system 203 or must be redirected to
 35 database system 229. In the former case, database system 203 executes the request and returns the data 206 resulting from the execution to the source of the SQL request;
3. If the request must be redirected, a *miss* has occurred and database system 203 redirects part or all of the SQL request to database system 229, as
 40 shown by arrow 231;

4. Database system 229 executes the redirected portion of the SQL request and returns the results to database system 203 (arrow 233), which integrates it with any part of the results obtained in database system 203 and returns the complete results 206 to the source of SQL request 204.
- 5 There are many reasons why a miss may occur. Perhaps the most common is that an object referred to in the request is not present in database system 203; another is that the request updates an object and the object is read only in database system 203 but updateable in database system 229; a third is that the request uses information about an object that may be different in database system 203 and in database system 229; a fourth is that the user making the request has privileges in database system 203 that prohibit the request and privileges in database system 229 that allow it.

The description which supports the claim language is perfectly clear:

- 15 3. If the request must be redirected, a *miss* has occurred and database system 203 redirects *part or all* of the SQL request to database system 229, as shown by arrow 231; (emphasis added)
4. Database system 229 executes the redirected portion of the SQL request and returns the results to database system 203 (arrow 233), *which integrates it with any part of the results obtained in database system 203* and returns the complete results 206 to the source of SQL request 204. (emphasis added)

As set forth at (3), either part or all of the SQL request is redirected; if part is redirected, (4) sets forth that the results of the redirected part are integrated with any part of the results obtained in database system 203. A non-exclusive list of reasons why a miss may occur (i.e., why the SQL request is preferably executed in whole or in part in the other database system) is given in the last paragraph of the portion of Appellants' Specification cited above.

30 Examiner finds claim 5's limitation " redirecting that part of the execution to the other database system" at col. 6, lines 50-65 of Bogantz, which is part of the description of how Bogantz's database system deals with queries to records that are being updated.

The rest of that description is in the following paragraph of Bogantz:

35 The pointer field in each record is used to indicate that an update is in progress. A non-zero value in the pointer field indicates that an update of the record is in progress. The non-zero value actually corresponds to the index of the current selected database. Accordingly, if the pointer field of a record being queried has a non-zero value, the database will halt processing of the query and launch a request back to the querying system

40 106 to send the query to the selected database indicated by the pointer field. The pointer field therefore performs the dual function of indicating

that the record is being updated and identifying the database which is the selected database.

As already pointed out in the *Demonstration that Bogantz does not anticipate*
5 *Appellants' claims*, what happens in Bogantz when a record in a database is being updated is that the record being updated has a pointer to another database that contains a copy of the record that is not being updated. The queried database returns the pointer from the record and the querying system uses the pointer to query the other database. The redirection is thus from the first database to the querying system
10 to the second database, *not* from the "particular database system" to the "other database system", as required by claim 5.

Examiner's argument regarding the added limitation of claims 6 and 19

Examiner's argument here is that the added limitation of these claims, that "the step of
15 determining ... determines that an object required for execution of the request is lacking in the particular database system" is anticipated by Bogantz's disclosure that a when a query requests a record that is being updated and is therefore not available from a first database, Bogantz' database querying system dedirects the query to another database. The first problem here is once again that a "database" is not a
20 "database system"; the second problem is that "lacking" is not the same as "not available". In Bogantz, the data requested by the query is *present* in the record; it is just not available because it is being updated.

Examiner's arguments regarding the added limitations of claims 8 and 17 and 9 and
25 *18*

See the discussion of these claims in the *Demonstration that Bogantz does not anticipate Appellants' claims* above.

30 **Conclusion**

Appellants have answered all of Examiner's responses to their arguments in their *Appeal Brief* and have thereby once again demonstrated that claims 5-7, 10-16, and 19-24 are not anticipated by Bogantz and that claims 8,9,17, and 18 are not rendered obvious over the combination of Bogantz with Taylor or Souder. Appellants
35 consequently again respectfully requests that the Board of Appeals reverse Examiner

with regard to all of his rejections and remand the application to Examiner for further processing as indicated by the reversals.

Respectfully submitted,

/Gordon E. Nelson/

Attorney of record.

Gordon E. Nelson

57 Central St., P.O. Box 782

Rowley, MA, 01969.

Registration number 30,093

Voice: (978) 948-7632

Fax: (866) 723-0359

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Date